

NON-PUBLIC?: N
ACCESSION #: 8808030003
LICENSEE EVENT REPORT (LER)

FACILITY NAME: St. Lucie, Unit 1 PAGE: 1 of 4

DOCKET NUMBER: 05000335

TITLE: Reactor Trip On High Pressurizer Pressure Due To Turbine Runback
Caused By Loss Of 1B Condensate Pump
EVENT DATE: 06/30/88 LER #: 88-004-00 REPORT DATE: 07/25/88

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: A. B. Johnson, Shift Technical Advisor TELEPHONE #: 407-465-3550

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: SD COMPONENT: 61 MANUFACTURER: I005
REPORTABLE TO NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On June 30, 1988, St. Lucie Unit One was operating at 100 percent power steady state in Mode 1. At 0548 hours, St. Lucie Unit One experienced a main turbine runback to 60 percent power due to the loss of the 1B Steam Generator Feed Pump (SGFP). The 1B SGFP tripped due to an interlock with the running condensate pump that tripped on its equipment protective relay. The 1B Condensate Pump tripped on a Current Balance Relay actuation. The reactor automatically tripped on high pressurizer pressure. The trip was uncomplicated and the unit was quickly stabilized in Hot Standby, Mode 3.

The root cause for the 1B Condensate Pump to trip was a spurious actuation of its Current Balance Relay.

The following corrective actions have been implemented: replaced the Current Balance Relay, failure analysis testing on the relay will be performed, modified the Current Balance Relay setpoints for both 1A and 1B Condensate Pump motors to reduce sensitivity to spurious actuation, and a Request for Engineering Assistance has been initiated to perform a study on the necessity of the Current Balance Relay and means to prevent unnecessary condensate

pump trips.

(End of Abstract)

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DESCRIPTION OF EVENT

On June 30, 1988, St. Lucie Unit One was operating at 100 percent power steady state in Mode 1. There were no evolutions or surveillances in progress. All automatic controllers were in automatic with the exception of the Control Rod Drive System (EIIS:JD) which was in "OFF".

At 0548 hours, the 1B Condensate Pump (EIIS:SD) tripped causing the 1B Steam Generator Feed Pump (SGFP) (EIIS:SJ) to trip by interlock with the 1B Condensate Pump. The loss of the 1B SGFP initiated a main turbine runback (EIIS:JJ) to 60 percent power. The Reactor Control Operator (RCO) alerted to the event by various annunciator alarms (EIIS:IB) attempted to restart the 1B Condensate Pump, but the pump failed to restart. Primary temperature and pressure were increasing rapidly due to the mismatch between reactor power and turbine power caused by the main turbine runback. Approximately 30 seconds into the transient, the Reactor Protective System (RPS) (EIIS:JC) initiated an automatic reactor trip on high pressurizer pressure (EIIS:JC) at 2400 psia.

The trip was an uncomplicated trip and all systems functioned normally. The Power Operated Relief Valves (PORV) (EIIS:AB) received the same input signals as the RPS trip bistable to actuate the valves at 2400 psia, however, the PORVs did not relieve the primary system pressure because their associated block valves were closed due to PORV seat leakage. The peak pressure of the Reactor Coolant System (RCS) (EIIS:AB) during the transient was approximately 2400 psia and did not challenge the Pressurizer Code Safeties (EIIS:AB). The Steam Bypass Control System (SBCS) (EIIS:JI) operated to reduce primary average temperature (T-avg) to the zero power setpoint of 532 degrees F. Auxiliary Feedwater (EIIS:BA) was manually initiated to control steam generator levels for RCS heat removal. The manual initiation of Auxiliary Feedwater was initiated prior to the completion of the time delay logic for automatic actuation of Auxiliary Feedwater via Auxiliary Feedwater Actuation Signal (AFAS) (EIIS:JE). AFAS actuated on low steam generator (S/G) level. The standard post trip actions were completed with all safety functions verified and the unit was quickly stabilized in Hot Standby, Mode 3.

CAUSE OF EVENT

The cause of the main turbine runback was the SGFP trip. The SGFP tripped

due to an interlock associated with the running condensate pump. The condensate pump tripped on a spurious actuation of its Current Balance Relay. Following the unit trip, the Electrical Maintenance Department and Florida Power & Light System Protection Group commenced extensive troubleshooting of the 1B Condensate Pump motor, breaker, electrical transfer switch, and protective circuits. No abnormalities were discovered. The root cause of the relay actuation was determined to be a spurious actuation.

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ANALYSIS OF EVENT

This event is reportable under 10 CFR 50.73 (a)(2)(iv), "any event or condition that resulted in manual or automatic actuation of any Engineered Safety Feature (ESF), including the Reactor Protection System (RPS)".

The loss of the 1B Condensate Pump was a result of a spurious actuation of the Current Balance Relay. The purpose of this relay is to provide protection of the condensate pump motor against the following conditions: an open phase, phase unbalance, or ground fault conditions. The 1B SGFP tripped as expected due to an interlock associated with the 1B Condensate Pump. This interlock is designed to trip the SGFP upon losing the associated Condensate Pump when total feed flow is greater than 50 percent and both SGFPs are running.

The loss of the 1B SGFP resulted in a main turbine runback and a reduction in normal feedwater flow. The main turbine runback is initiated when one of the two running SGFPs trip and the main turbine load is greater than 60 percent. The main turbine runback is not required for reactor safety and is intended to reduce main steam load in response to reduced feedwater flow and subsequent decrease in steam generator water inventories. If the main turbine runback failed to initiate, the RPS would have automatically tripped the reactor on low S/G level ensuring minimum inventory needed for adequate RCS heat removal with sufficient time available for the Auxiliary Feedwater System to supply water to the steam generators. The Auxiliary Feedwater System was available during the entire event.

The Power Operated Relief Valves (PORV) had been placed in the blocked condition by having their associated block valves closed due to seat leakage of the PORVs. For a Loss of Feedwater type of accident, no credit is taken in the updated Final Safety Analysis Report (FSAR) for the automatic actuation of the PORVs to relieve primary system pressure; therefore, having the PORVs blocked did not contribute to the event. The configuration is allowed in accordance with Technical Specifications.

This event was observed to be a routine reactor trip on high pressurizer

pressure. The resulting transient was well enveloped by the St. Lucie Unit One updated Final Safety Analysis Report (FSAR) section 15.2.8 "Loss of Normal Feedwater Flow". All Plant Safety Functions were met and there were no additional complications. At no time during the event were the health and safety of the public endangered.

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CORRECTIVE ACTIONS

1. Meggered the 1B Condensate Pump motor, breaker, electrical transfer switch, and tested protective circuits. No abnormalities were found.
2. Replaced the Current Balance Relay.
3. The Current Balance Relay will be sent to the relay vendor for Failure Analysis testing.
4. As directed by System Protection Group and General Engineering, the Current Balance Relay setpoints were modified for both 1A and 1B Condensate Pump motors to reduce the sensitivity to spurious actuation.
5. A Request For Engineering Assistance was initiated to perform a study on the necessity of the Current Balance Relay and to identify means to prevent unnecessary Condensate Pump trips.

ADDITIONAL INFORMATION

Component Information:

Manufacturer: ITE Current Balance Relay

Model #:ITE 46D

Previous Similar Events:

LER 335-87-013 is similar to this event with the exception to the initiating event. The event was caused by the loss of the 1B Steam Generator Feed Pump (SGFP).

ATTACHMENT # 1 TO ANO # 8808030003 PAGE: 1 of 1

P. O. BOX 14000, JUNO BEACH, FL 33408-0420
FPL

JULY 25, 1988

L-88-318
10 CFR 50.73

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Gentlemen:

Re: St. Lucie Unit 1
Docket No. 50-335
Reportable Event: 88-04
Date of Event: June 30, 1988
Reactor Trip on High Pressurizer Pressure Due to
Turbine Runback Caused by Loss of 1B Condensate Pump

The attached Licensee Event Report is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Very truly yours,
/s/ W. F. Conway
W. F. Conway
Senior Vice President - Nuclear

WFC/GRM/cm
Attachment
cc: Dr. J. Nelson Grace, Regional Administrator,
Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

GRMRTLER

*** END OF DOCUMENT ***
